Second, SNET's proposal to allocate 50 percent of the new broadband loop common costs to Personal Vision likewise is consistent with the Commission's past suggestion that it would view a 50/50 common cost allocation factor as reasonable.[16/] It also is consistent with the agency's request for comments in this proceeding on the desirability of using a 50/50 allocator.[17/]

SNET's approach deviates from the FCC's tentative proposals in four ways. But as we now show, there are sound reasons for each of these deviations.

First, while the Commission proposes to allocate incremental and common costs between "regulated" and "non-regulated" services, SNET proposes to allocate such costs between telephony service on one hand and broadband services on the other. Moreover, it would allocate costs to the broadband service category regardless of whether the broadband service at issue is regulated or non-regulated.

SNET's proposal in this regard is preferable to the FCC's tentative plan because it would provide more protection for telephony ratepayers. Under the Commission's proposal, telephony ratepayers would bear less than 50 percent of broadband loop common costs in the future only if SNET, in the future, added additional regulated broadband services since 50 percent of all common costs initially allocated to regulated telephony then could be spread

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[16/] See Bell Atlantic Tel. Companies, DA 95-1928 ¶¶24-27 rel. Sept. 8, 1995).

[17/] Notice at ¶¶39-40.

over the newly added regulated services. By contrast, under SNET's approach telephony ratepayers and Personal Vision's cable service initially would share 50 percent of all broadband loop common costs, but telephony ratepayers would benefit from the future addition of both regulated and non-regulated broadband services. This is because, as noted above, SNET would reduce the 50/50 allocation of the new broadband loop common costs to both service categories (telephony and broadband) when a new broadband service was added, regardless of whether the newly added service is a regulated service or a non-regulated service.

Second, the Commission appears to contemplate that a LEC would use the cost allocation factors established in this proceeding to remove network investment from regulated investment accounts whereas SNET proposes to use these factors to attribute revenue to its regulated revenue accounts in accordance with the agency's affiliate transaction rule. While both approaches would have the effect of reducing the costs for which telephony ratepayers were responsible by a comparable amount, SNET's approach is preferable because it is less cumbersome from an administrative standpoint. A 50/50 allocator for broadband loop common costs eliminates the controversy that could occur over subscribership projections if the allocator were based on projected future subscribership. In addition, there will be fewer reporting requirements using SNET's approach. At the same time, SNET's proposal protects telephony ratepayers and provides a benefit to these ratepayers in terms of

the revenue that will be received for the network transport service which SNET will provide to Personal Vision.

Third, although the FCC proposes to require that LECs divide all costs into numerous discrete cost pools (e.g., a "loop plant" pool, a "maintenance expense" pool, an "interoffice transmission" pool, etc.) and then apply the relevant allocator(s) to the pool at issue, requiring that SNET undertake this additional recordkeeping obligation would serve no useful purpose. As we have explained, SNET will directly assign all costs to Personal Vision's cable TV service which can be directly assigned, and it will apply the 50/50 allocator to all broadband loop common costs which cannot be directly assigned. This simple approach eliminates the need to establish numerous separate cost pools.

Finally, while the FCC proposes to require LECs to allocate interoffice transmission facilities by using the allocation factor applicable to common loop costs, it would be unfair to SNET's telephony ratepayers if the Commission were to require that SNET use its 50/50 common cost allocator in order to allocate its broadband interoffice transmission facilities. SNET will offer broadband interoffice transmission capability to all interested parties, including Personal Vision, on the same terms and conditions pursuant to a tariff which SNET has filed with the Commission. In accordance with the FCC's affiliate transaction rule, SNET will record on its regulated revenue accounts the price reflected in its tariff for any interoffice transmission facilities

used by any party, including Personal Vision.[18/] Requiring SNET to allocate 50 percent of its interoffice transmission facility costs to its telephony ratepayers would disadvantage those ratepayers by requiring them to absorb 50 percent of all broadband interoffice transmission facility costs even though there is no demand for those facilities by telephony customers.[19/]

III. The Commission Should Apply to Incumbent Cable Operators Whatever Cost Allocation Requirements It Adopts In the Present Proceeding

Once the Commission has determined what cost allocation requirements it will apply to LECs, it should immediately apply those same requirements to incumbent cable TV operators. Incumbent cable operators are upgrading their networks in order to provide telephony at a pace which is at least as rapid as LECs are upgrading their infrastructure in order to provide broadband ser-

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[18/] See Section 32.27(d) (LEC providing service under tariff shall record the service in regulated revenue accounts at tariff rate).

[19/] Notice at ¶56. The Commission asks whether it should change the way that the cost of switching facilities is allocated. Id. at ¶44. Existing rules would require LECs to allocate the cost of any switching facilities used to provide both telephony and broadband service based on the relative number of minutes those facilities are used by broadband and telephony services respectively, but the Commission states its belief that minutes of use may be a less significant determiner of switching costs if LECs use certain new switching technologies in their broadband networks. Id. Even if the FCC correctly assumes that call duration may be a less significant determiner of switching costs in the future, there is no need to make any change at this time in the way the cost of switching facilities is allocated because broadband services will not use shared switching facilities to a significant extent in the near future.

vices.[20] Moreover, the Commission has recognized that rules governing an incumbent cable TV operator's allocation of costs between cable and telephony service should be identical to rules governing a LEC's allocation of costs between telephony and other services:

> "[O]ur rules regarding allocation [by incumbent cable operators] of costs associated with services not subject to cable rate regulation are likely to be revisited in the near future in light of developing circumstances, including in particular convergence of the telephone and cable industries."[21]

Notwithstanding the FCC's recognition that the cable TV and LEC cost allocation rules should be identical, those rules are different in a variety of respects today and may vary even more as a result of the action taken by the Commission in the present pro-

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[20] For example, TCI, the largest cable operator in Connecticut (serving 350,000 households) has upgraded its cable TV network in order to provide telephony and has announced its intention to begin providing residential and business telephone service by year end in West Hartford where it provides cable service. See TR Daily at 3 (April 29, 1996). In fact, TCI already has begun test marketing that service. Connecticut's second largest cable operator, Cablevision (serving about 250,000 households), likewise has completed a $250 million upgrade of its cable TV network and has announced that it intends shortly to begin providing telephony in Connecticut.

[21] Recon. of Cable TV Costs Order at ¶121, FCC 95-502 (rel. Jan. 26, 1996).

ceeding. This result can be avoided by conforming the cost allocation rules applicable to incumbent cable operators to the outcome of the present proceeding.

CONCLUSION

The Commission should act consistent with the proposals described above.

Respectfully submitted,

THE SOUTHERN NEW ENGLAND TELEPHONE COMPANY

By: _____

Rodney L. Joyce
Ginsburg, Feldman and Bress
1250 Connecticut Avenue, N.W.
Washington, D.C. 20036
(202) 637-9005

Madelyn M. DeMatteo
Alfred J. Brunetti
Maura C. Bollinger
The Southern New England
Telephone Co.
227 Church Street
New Haven, CT 06506

Its Attorneys

Date: May 31, 1996

NATIONAL ECONOMIC

RESEARCH ASSOCIATES

ONE MAIN STREET, CAMBRIDGE, MASSACHUSETTS 02142

Consulting Economists

AFFIDAVIT OF DR. WILLIAM E. TAYLOR

May 31, 1996

AFFIDAVIT OF DR. WILLIAM E. TAYLOR

I. INTRODUCTION AND SUMMARY.

1. My name is William E. Taylor. I am Senior Vice President of National Economic Research Associates, Inc. (NERA), head of its telecommunications economics practice and head of its Cambridge office. My business address is One Main Street, Cambridge, Massachusetts 02142.

2. I have been an economist for over twenty years. I received a B.A. degree in economics (Magna Cum Laude) from Harvard College in 1968, a master's degree in statistics from the University of California at Berkeley in 1970, and a Ph.D. in Economics from Berkeley in 1974, specializing in industrial organization and econometrics. I have taught and published research in the areas of microeconomics, theoretical and applied econometrics, and telecommunications policy at academic institutions (including the economics departments of Cornell University, the Catholic University of Louvain in Belgium, and the Massachusetts Institute of Technology) and at research organizations in the telecommunications industry (including Bell Laboratories and Bell Communications Research, Inc.). I have participated in telecommunications regulatory proceedings before state public service commissions and the Federal Communications Commission (FCC) concerning competition, incentive regulation, price cap regulation, productivity, access charges, pricing for economic efficiency, and cost allocation methods for joint supply of video, voice and data services on broadband networks. A copy of my vita is provided as Attachment 1 to this Affidavit.

3. I prepared this Affidavit at the request of Southern New England Telephone Company (SNET) to review and comment on the methods to allocate fixed common costs between telephony and broadband services proposed in the FCC's Notice of Proposed Rulemaking in CC Docket No. 96-112, and application of those methods to the procedure SNET has used to develop the terms of a Shared Service Agreement (Agreement) with its cable television (TV) affiliate, SNET Personal Vision, Inc. In particular, I address the cost allocation procedures, including the FCC's rules (current and proposed) and SNET's proposal to allocate 50 percent of

the common costs of SNET's hybrid fiber coax (HFC) network to each of the regulated (telephony) and nonregulated (cable TV) categories. I find that (i) use of a fixed allocator to assign fixed common costs to regulated and nonregulated services is arbitrary but reasonable, provided the resulting allocation does not harm the competitive prospects of either the regulated or nonregulated service and (ii) that SNET's proposed cost allocation methods are in conformance with sound economic principles.

II. ECONOMIC CONCEPTS AND THE FCC'S RULES.

4. The economic principles underlying the allocation of fixed common costs to regulated and nonregulated services are straightforward and easily stated. They are the proper foundation by which to appraise proposed changes to the FCC's Part 64 cost allocation rules and to ensure that SNET's proposed Agreement with Personal Vision does not improperly disadvantage either current telephone or video customers or users of future broadband telephone services. These requisite economic principles and the FCC's rules make clear how to define and identify subsidized services and—where prices are affected by accounting costs—to allocate direct and common costs to services to ensure that competitive services do not receive a subsidy.

A. The Economic Definition of Cross-Subsidy.

5. To reduce the risk of confusion, it is important to understand at the outset what cross-subsidization in economic theory is and is not. In economic theory, a service receives a subsidy if the additional revenue caused by provision of the service fails to cover the additional costs caused by supplying the service (or, equivalently, the costs that would be saved if the service were discontinued in its entirety).[1] For example, the HFC facilities that SNET proposes to use to provide services to Personal Vision will not be subsidized as long as the additional revenues

[1] These concepts are well-established in economics, though the nomenclature sometimes varies. See, e.g., W.J. Baumol, "Minimum and Maximum Pricing Principles for Residual Regulation," *Eastern Economic Journal* V(1-2), January/April 1979, at 235-248. W.J. Baumol and G. Sidak, *Toward Competition in Local Telephony*, Cambridge: The MIT Press, (1994) at 55-59. G.R. Faulhaber, "Cross-Subsidization: Pricing in Public Enterprises," *American Economic Review* 65(5), December 1975, at 966-977.

from the anticipated services are more than sufficient to compensate SNET for the additional expenses directly attributable to the provision of those HFC facilities used by Personal Vision.

6. This economic definition and measurement of cross-subsidy in terms of incremental cost and incremental revenue is motivated by both efficiency and fairness concerns. If prices are based on forward-looking economic incremental costs, they foster allocative and technical efficiency.[2] As long as incremental revenue equals or exceeds incremental cost, pricing for the service in question fosters fairness across customers and across competitors: services will provide a positive flow of contribution, and the firm's decision to supply the service will not unfairly disadvantage customers of any other service or any competitor.

7. The focus on added revenues and costs is correct from an economic perspective because, interpreted properly, the requirement that added revenues exceed added costs for a project or a service is precisely the economic requirement that the project or service not receive a subsidy. This test for cross-subsidy measures the consequences of providing and not providing a service. Thus, the costs used in this test must include all costs which change when the firm decides to provide the service, and costs which do not change when the firm decides to produce the service must not be included in this calculation. This test includes no allocations of fixed (i.e., volume insensitive) costs that are shared with other services—common costs.

8. All economists recognize that after incremental costs are directly assigned to services on the basis of cost-causation, the assignment of the remaining common costs to services, on any basis, is arbitrary.[3]

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[2] Technical (or first-order) economic efficiency measures the value of the resources expended to produce goods and services. If prices are set at incremental cost, only low cost firms will be able to serve the market, and the costs of production will be as small as possible. Allocative efficiency is measured by the over-consumption (or under-consumption) of a service when its price is below (or above) incremental cost. For example, when a service is priced below incremental cost, some customers are induced to purchase that service which they value less than the cost society incurs to provide it.

[3] The Notice of Proposed Rulemaking in this Docket appears to claim that common costs can be attributed to individual services in a cost-causative manner: see Allocation of Costs Associated with Local Exchange Carrier Provision of Video Programming Services, Notice of Proposed Rulemaking, CC Docket No. 96-112 (May 10, 1996) (LEC Video Cost Allocation NPRM) at 6, footnote 19. In fact, careful reading of the footnote shows that common costs are defined idiosyncratically to be costs that vary with the output of the individual services. In standard economic nomenclature, common costs can be fixed (i.e., volume insensitive) or variable and it is only the presence of fixed common costs that gives rise to a cost allocation problem.

> The only costs that have objective reality are ones that describe a causal relationship between the act of purchase and their incurrence. Cost allocations that are not grounded in causality have no basis in objective reality; they have no meaning independent of the prices they are suppose to justify, except in some ritualistic, incantational sense. Allocations of cost on the basis of benefit or some other conception of fairness are tautological, or teleological; they are merely a plausible device for clothing with the appearance of cost justification some preconceived notion of what the proper price *should* be, rather than meaningfully independent tests of the economic propriety of those prices.[4]

In addition, such costs have no relevance in determining whether or not a service is receiving a subsidy: as long as the incremental revenues from the provision of a particular service exceed the incremental—directly, cost-causally assigned--costs of the service, all customers are better off if the service is provided. While allocation of common costs is an inherently arbitrary process,[5] there are cost allocators that, though arbitrary, are reasonable. After all, unregulated multiproduct firms in competitive markets take market prices as given, and yet, in equilibrium, must necessarily recover their total costs, including common costs, from prices which equal or exceed their incremental costs in each market. Those prices can be thought of as "reasonable" allocators of cost and are reasonable because the "allocators" are determined by competitive processes in different markets.

9. A reasonable (but arbitrary) allocator of costs—if such an allocation were to be used to set prices, for a firm regulated by a regime other than price caps—likewise would depend on market conditions and the demand for the service in question. To take a simple case, any allocator or other price setting mechanism that ignores the market and results in prices for a service being set above both incremental cost and the competitive market price would be unreasonable. Even though the firm could profitably supply output at the market price—or marginally lower—customers would be denied that additional choice of supplier and the marginally lower price. In general, all parties to the transaction would be made better off if the

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[4] A.E. Kahn and W.B. Shew, "Current Issues in Telecommunications Regulation: Pricing," *Yale Journal on Regulation*, Vol. 4, No. 2, (1987) at 207.

[5] LEC Video Cost Allocation NPRM at ¶ 23.

firm were permitted to set prices as low as incremental cost when required to by market forces. Thus a fundamental test of the reasonableness of an allocation mechanism is that if the resulting costs were used to set prices, the mechanism would not allocate so large a proportion of fixed common costs to one service that the service would no longer be competitively priced in the market.

B. The FCC's Price Cap Rules.

10. Price cap regulation breaks the link between prices and costs for regulated services. Under the FCC's price cap plan, prices of interstate telephone services are determined without reference to costs; annual price changes are constrained by the price cap index (PCI). Cost changes from investments in nonregulated services do not enter the price cap formulas and thus can have no effect on the prices that LECs charge for price-cap-regulated services. Recently, nearly all of the price cap regulated LECs selected pure price cap regulation: i.e., the price cap option with the highest productivity offset and no sharing requirement.[6] In this pure form, price cap regulation denies regulated companies any entitlement to recover from customers of regulated telephone service any reductions in rate of return resulting from price cuts in competitive markets. Thus, the incentive and the ability to shift costs from competitive services to regulated telephone services is eliminated. As a result, there is no need to perform arbitrary cost allocations for those firms under price cap regulation—especially pure price cap regulation—because the cost allocations have no effect on the prices charged for regulated services.

11. Moreover, the FCC's consideration of exogenous cost changes to reflect changes in the Part 64 allocation factor are unnecessary—and potentially harmful—under its price cap regulation plan.[7] The industry productivity factor used to calculate each firm's PCI captures the average reduction in costs realized by the LEC industry, including the cost reduction

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[6] *Ibid.* at ¶61.

[7] LEC Video Coast Allocation NPRM at ¶¶ 58-59.

attributable to economies of scope in the network. An additional adjustment to the PCI to account for such network efficiencies would result in double counting of cost savings.[8]

C. The FCC's Cost Allocation Rules.

12. The FCC has implemented a number of accounting safeguards to prevent cross-subsidization of interstate services, including (i) establishing cost allocation rules in the Joint Cost Order, (ii) requiring the filing of cost allocation manuals, (iii) requiring independent audits of cost allocations, (iv) implementing reporting requirements with automated data storage and analysis, and (v) performing on-site audits by the FCC staff.[9] In addition, the FCC currently is exploring specific cost allocation rules for LECs in the provision of video services[10] and, among other issues, it seeks comment

> "on specific allocation factors, such as 50 percent that would split the costs of loop plant equally between regulated and nonregulated activities or some other factor."[11]

13. LECs must comply with current FCC rules, which already provide strong ratepayer and competitive safeguards. The FCC currently enforces rules (47 Code of Federal Regulations § 64, Subpart I-Allocation of Costs) that allocate costs between regulated (e.g., basic telephone service) and nonregulated activities, so that nonregulated costs are not assigned to regulated interstate or intrastate services. Because these rules first assign costs, to the extent possible, on the basis of cost-causation, the resulting cost assignment ensures that at least the incremental costs of each category of service are assigned to each category of service.[12] Costs which cannot be directly assigned are termed "common costs."

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[8] This situation is similar to the one the FCC has already recognized: "...a general change in tax rates...will be reflected in the inflation factor used to adjust price caps annually Exogenous treatment of a tax change would thus unfairly 'double count' its impact." *Ibid.* at ¶59.

[9] Computer III Remand Proceedings: Bell Operating Company Safeguards and Tier 1 Local Exchange Company Safeguards, Report and Order, CC Docket No. 90-623, 6 FCC Rcd 7591 (1991). (BOC Safeguards Order)

[10] LEC Video Cost Allocation NPRM at ¶2.

[11] LEC Video Cost Allocation NPRM at ¶39.

[12] Such cost assignments may still differ in practice from the economic incremental cost of the service because embedded accounting costs differ from forward-looking economic costs. For example, all cost allocations (continued...)

14. For companies not under pure price cap regulation, the effect of the FCC's requirements to allocate aggregate accounting costs across services (and jurisdictions) is—whatever else may be said about it—an effective safeguard to prevent the subsidization of competitive services at the expense of non-competitive services. Indeed, the tendency of these rules has been to allocate common costs so as to subsidize in the opposite direction: overallocating costs for nonregulated services to hold down prices for basic exchange service. The price structure that results from these cost allocations is not necessarily efficient, and economists are unanimous in their criticism of these methods of setting prices using fully distributed costs. However. the issue is not whether prices based on allocated costs are economically efficient, but whether such cost allocations are effective in preventing the underpricing of nonregulated services at the expense of regulated services. When such cost allocations are used to set prices, they generally perform that function "not wisely, but too well."

15. An additional safeguard that prevents cross-subsidization from telephony to broadband services is the price cap form of regulation that constrains SNET's prices for telephone services in both the interstate and intrastate jurisdiction. In neither jurisdiction can SNET base an increase in telephone service prices on changes in its regulated costs or earnings. Because its prices are effectively separated from its accounting costs, SNET cannot subsidize below-cost pricing of competitive video services by price increases for telephone service. Under pure price cap regulation—compared with traditional earnings-based rate of return regulation—the role of cost allocation in preventing cross-subsidization is much reduced.

16. Any cost allocation scheme the FCC adopts—which is unnecessary for firms regulated by pure price caps—must be calibrated against the effect in the retail markets for the services whose prices might be set using allocated costs.[13] In the current case, both telephony and video market forces will determine the levels at which service prices can be set above direct incremental costs. As long as SNET's prices for a service recover its direct incremental costs

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(...continued)

calculate plant costs using regulatory depreciation rates which yield lower capital costs than forward-looking economic costs based on economic depreciation rates

[13] Of course, fully distributed cost should not be used to set prices. The proper price floor is incremental costs.

and any portion of common costs, customers of all of its services are better off than if the service were not provided at all. The level of contribution for a service priced above incremental cost must be free to vary with market conditions. It will differ from company to company, from service to service, and may well differ over time for a specific company as additional services that use the common plant come on line. While an allocator which is fixed—i.e., does not vary over time or company with relative use or relative direct investment or the like—may be a reasonable regulatory expedient, it is not reasonable to require the same fixed allocator for all companies, all technologies and all time.

III. SNET'S SHARED SERVICE AGREEMENT WITH ITS CABLE TV AFFILIATE COMPLIES WITH ECONOMIC THEORY AND THE FCC'S COST ALLOCATION RULES.

17. The Agreement[14] between SNET and Personal Vision establishes the terms and conditions of the access to SNET's HFC network needed by Personal Vision to provide cable TV services to subscribers throughout Connecticut.[15] While three separate tiers make up the service,[16] only the HFC component, which includes the fiber and coax links to the subscribers premises,[17] is covered by the Agreement. The HFC distribution channel facilities are complex: some channel plant investment is specific to cable service, some specific to voice service, and

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[14] The details of the Agreement are presented in the Testimony of David F. Clark and Wayne R. Davis on Behalf of the Southern New England Telephone Company before the State of Connecticut Department of Public Utility Control, Application of SNET Personal Vision, Inc. for a Certificate of Public Convenience and Necessity to Operate a Community Antenna Television System, Docket No. 96-01-__, January 25, 1996 (Clark and Davis Testimony). The facilities covered in the Agreement include "central office equipment, fibers and related electronics, and coaxial cable associated with SNET's HFC Network which is currently under construction." (Clark and Davis Testimony at 6)

[15] The services SNET Personal Vision intends to provide are described in its Application for a Certificate of Public Convenience and Necessity to Provide Community Antenna Television Service, January 25, 1996 (Application). Personal Vision applied for a 15-year franchise, which would initially offer 76 channels of television programming with service packages ranging from basic to pay-per-view services (Application at 3 and 11).

[16] The Regional Head-ends and the Remote Hub and End Office equipment, which will be owned by Personal Vision, are clearly incremental to video services—they are not used in any fashion by voice services.

[17] Application at 13-14.

some is common to both. For services available from tariffs, such as interoffice facilities access, Personal Vision will be charged the tariff rates.[18]

18. To comply with the FCC's requirements, SNET is required to assign to the Agreement prices all of the directly assignable costs plus an allocation of common costs. Direct costs are calculated as the sum of (i) unit investment of broadband applications for Personal Vision's cable services, (ii) incremental depreciation, return and tax costs associated with the unit investment,[19] and (iii) maintenance and other direct expenses for the facilities used by Personal Vision.[20] From an economic perspective, removal of these direct costs from the regulated entity ensure that Personal Vision does not receive a cross-subsidy because the terms of the Agreement exceed the forward-looking incremental cost of the service.

19. Common costs are then allocated between telephony and cable TV so that 50 percent of the common costs are added to the Agreement prices of the services provided to Personal Vision.[21] As discussed above, such common costs cannot be causally assigned to any particular service. SNET's proposal to assign 50 percent of the fixed common costs to telephony and 50 percent to services in the Agreement thus has no foundation in cost causality. However, because any allocation (i) precludes subsidization of Personal Vision services by telephony services, (ii) will not inhibit SNET's network investment, and (iii) apparently harms the competitive prospects of neither SNET or Personal Vision, the allocation is reasonable from SNET's business perspective.

20. Because the Agreement recovers not only direct costs and overhead loadings but 50 percent of common costs, provision of the service will benefit telephone ratepayers by recovering direct costs as well as contributing to the recovery of the common costs of the firm. SNET's proposed Agreement conforms with the current FCC rules and SNET has properly set

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[18] Clark and Davis Testimony at 3.

[19] *Ibid.* at 7.

[20] *Ibid.* at 8.

[21] *Ibid.* at 8.

the terms of the Agreement on the basis of two economic principles described above—cost-causation and marketplace realities.

21. Of course, the proposed fixed allocator depends on the mix of services and technologies currently being offered. If SNET were to offer new services over its broadband network[22]—possibly having different proportions of incremental and fixed common costs—a 50/50 allocation of fixed common costs would no longer make sense, and an equiproportional allocation of costs might not be correct either. While a fixed allocator may be the most expedient way to assign fixed common costs between regulated and nonregulated services, the particular allocator must be sufficiently flexible to differ by company, by technology and over time.

22. Ultimately, it is market forces that limit the firm's ability to recover different amounts of fixed common costs in different markets, and the allocator selected must be sufficiently flexible to adapt to the marketplace realities of the telephone and broadband services in question. If the FCC requires a firm to select an allocator, it should allow the firms the flexibility to select an allocator that is appropriate given the individual set of circumstances. For example, while SNET's proposal of a 50 percent allocator is appropriate for its situation, it may be an unreasonable allocator for another firm using a different technology in a different market.

IV. CONCLUSION.

23. SNET's proposal to assign all those costs that are caused by the provision of the Agreement's services or that vary with the volume of services supplied eliminates the concern that those competitive services might receive a cross-subsidy. In addition, SNET proposes to assign a portion of the common costs to Personal Vision's operations. A reasonable allocation of common costs cannot hold the price of a service so high that customers do not purchase the service at all or sales of one vendor or one technology are preferentially treated in comparison

[22] The FCC acknowledged that this was a possibility in its LEC Video Cost Allocation NPRM at ¶2.

with its competitors. The efficient choice of goods and services, as well as vendors and technologies, must be made at the margin—so that for services perceived to be of equal quality the service having the lower marginal cost has a competitive advantage. If this advantage is distorted through a required unreasonable allocation of common costs, the potential efficiency gains from competition in video distribution will be lost.

WILLIAM E. TAYLOR

BUSINESS ADDRESS

National Economic Research Associates, Inc.
One Main Street
Cambridge, Massachusetts 02142
(617) 621-2615

Dr. Taylor received a B.A. *magna cum laude* in Economics from Harvard College, an M.A. in Statistics and a Ph.D. in Economics from the University of California at Berkeley. He has taught economics, statistics, and econometrics at Cornell and the Massachusetts Institute of Technology and was a Research Fellow at the Center for Operations Research and Econometrics at the University of Louvain, Belgium.

At NERA, Dr. Taylor heads the Cambridge office and is Director of the Telecommunications Practice. He has worked primarily in the field of telecommunications economics on problems of state and federal regulatory reform, competition policy, economic issues concerning broadband network architectures, quantitative analyses of state and federal price cap and incentive regulation proposals, and antitrust and contract litigation in telecommunications markets. He has applied the economic theories of price squeezes and cross-subsidization to long distance telephone, Centrex, and public telephone markets. In the area of environmental regulation, Dr. Taylor has worked on statistical issues in the measurement of emissions levels from coal-fired electric power generators and municipal waste-to-energy facilities.

He has published extensively in the areas of telecommunications policy related to access and in theoretical and applied econometrics. His articles have appeared in numerous telecommunications industry publications as well as *Econometrica*, the *American Economic Review*, the *International Economic Review*, the *Journal of Econometrics*, *Econometric Reviews*, the *Antitrust Law Journal*, *The Review of Industrial Organization*, and *The Encyclopedia of Statistical Sciences*. He has served as a referee for these journals (and others) and the National Science Foundation and is currently an Associate Editor of the *Journal of Econometrics*.

EDUCATION

UNIVERSITY OF CALIFORNIA, BERKELEY
Ph.D., Economics, 1974

UNIVERSITY OF CALIFORNIA, BERKELEY
M.A., Statistics, 1970

HARVARD COLLEGE
B.A., Economics, 1968
(Magna Cum Laude)

EMPLOYMENT

NATIONAL ECONOMIC RESEARCH ASSOCIATES, INC. (NERA)

1988- Senior Vice President, Office Head, Telecommunications Practice Director. Dr. Taylor has directed many studies applying economic and statistical reasoning to regulatory, antitrust and competitive issues in telecommunications markets. In the area of environmental regulation, he has studied statistical problems associated with measuring the level and rate of change of emissions.

BELL COMMUNICATIONS RESEARCH, INC. (Bellcore)

1983-1988 Division Manager, Economic Analysis, formerly Central Services Organization, formerly American Telephone and Telegraph Company. While at Bellcore, Dr. Taylor performed theoretical and quantitative research focusing on problems raised by the implementation of access charges. His work included design and implementation of demand response forecasting for interstate access demand, quantification of potential bypass liability, design of optimal nonlinear price schedules for access charges and theoretical and quantitative analysis of price cap regulation of access charges.

BELL TELEPHONE LABORATORIES

1975-1983 Member, Technical Staff, Economics Research Center. Performed basic research on theoretical and applied econometrics, focusing on small sample theory, panel data and simultaneous equations systems.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Fall 1977 Visiting Associate Professor, Department of Economics. Taught graduate courses in econometrics.

CENTER FOR OPERATIONS RESEARCH AND ECONOMETRICS
Universitϑ Catholique de Louvain, Belgium.

1974-1975 Research Associate. Performed post-doctoral research on finite sample econometric theory and on cost function estimation

CORNELL UNIVERSITY

1972-1975 Assistant Professor, Department of Economics. (On leave 1974-1975.) Taught graduate and undergraduate courses on econometrics, microeconomic theory and principles.

MISCELLANEOUS

1985- Journal of Econometrics, North-Holland Publishing Company.
Associate Editor.

Boards of Directors: National Economic Research Associates, Inc. (1990-), Episcopal Divinity School, Cambridge, Massachusetts (1995-).

TESTIMONIES

Florida Public Service Commission (Docket No. 820537-TP) on behalf of Southern Bell Telephone and Telegraph Company: economic analysis of premium intraLATA access charges. Filed July 22, 1983.

Arkansas Public Service Commission (Docket No. 83-042-U) on behalf of Southwestern Bell Telephone Company: economic analysis of non-traffic sensitive cost recovery proposals. Filed October 7, 1985.

Florida Public Service Commission (Docket No. 820400-TP) on behalf of Southern Bell Telephone and Telegraph Company: economic principles underlying a proposed method for calculating marginal costs for private lines services. Filed June 25, 1986.

Federal Communications Commission (Docket No. 87-313) on behalf of Bell Communications Research, Inc.: empirical analysis of the United States Telephone Association proposal for price cap regulation of interstate access service, entitled "The Impact of Federal Price Cap Regulation on Interstate Toll Customers." Filed March 17, 1988.

Florida Public Service Commission (Docket No. 880069-TL) on behalf of Southern Bell Telephone and Telegraph Company: economic incentives for firms under the proposed Florida Rate Stabilization Plan. Filed June 10, 1988.

California Public Utilities Commission (Case 88-04-029) on behalf of Pacific Bell: commission payment practices, cross-subsidization of pay telephones, and compensation payments to competitive pay telephone suppliers. Filed July 11, 1988.

Federal Communications Commission (Docket No. 87-313) on behalf of Bell Communications Research, Inc.: empirical analysis of the price cap plan proposed in the FCC Further Notice of Proposed Rulemaking, entitled "The Impact of the FCC Proposed Price Cap Plan on Interstate Consumers." Filed August 18, 1988.

Federal Communications Commission (Docket No. 87-313) on behalf of Bell Communications Research, Inc.: Rebuttal analysis of intervenor comments on "The Impact of the FCC Proposed Price Cap Plan on Interstate Consumers." Filed November 18, 1988.

New Hampshire Public Service Commission (Docket 89-010)) on behalf of New England Telephone & Telegraph Company: appropriate level and structure of productivity adjustments in a proposed price regulation plan. Filed March 3, 1989.

Federal Communications Commission (Docket No. 87-313) on behalf of Cincinnati Bell Telephone Company, "Incentive Regulation and Estimates of Productivity," (with J. Rohlfs), June 9, 1989.

Delaware Public Service Commission (Docket No. 86-20, Phase II) on behalf of The Diamond State Telephone Company: appropriate costing and pricing methods for a regulated firm facing competition, in connection with a proposed rate reduction. Filed March 31, 1989. Rebuttal testimony filed November 17, 1989.

Federal Communications Commission (Docket No. 87-313) on behalf of the United States Telephone Association: analysis of an AT&T filing and an empirical analysis of productivity growth under price cap regulation, entitled "Analysis of AT&T's Comparison of Interstate Access Charges Under Incentive Regulation and Rate of Return Regulation." Filed as Reply Comments regarding the FCC's Report and Order and Second Further Notice of Proposed Rulemaking in CC Docket 87-313, August 3, 1989.

Federal Communications Commission (Docket No. 87-313) on behalf of Southwestern Bell Telephone Company, "Taxes and Incentive Regulation," filed as Exhibit 3 to the Reply Comments of Southwestern Bell regarding the FCC's Report and Order and Second Further Notice of Proposed Rulemaking in CC Docket 87-313, August 3, 1989.

New York State Public Service Commission (Case 28961 - Fifth Stage) on behalf of New York Telephone Company: appropriate level and structure of productivity adjustments in a proposed price regulation plan. Filed September 15, 1989.

Georgia Public Service Commission (Docket No. 3882-U) on behalf of Southern Bell Telephone and Telegraph Company: analysis of incentive regulation plans. Filed September 29, 1989.

Public Utility Commission of Texas (Docket No. 8585) on behalf of Southwestern Bell Telephone Company: analysis of Texas intrastate switched access charges and bypass of switched access. Filed December 18, 1989.

Federal Communications Commission (Docket 87-313) on behalf of the United States Telephone Association: analysis of appropriate productivity offsets for local exchange carriers in the FCC price cap plan, entitled "Local Exchange Carrier Productivity Offsets for the FCC Price Cap Plan," May 3, 1990.

Federal Communications Commission (Docket 87-313) on behalf of the United States Telephone Association: analysis of appropriate productivity offsets for local exchange carriers in the FCC price cap plan, entitled "Productivity Offsets for LEC Interstate Access," June 8, 1990.

Federal Communications Commission (Docket 87-313) on behalf of the United States Telephone Association: analysis of appropriate productivity offsets for mid-size telephone companies in the FCC price cap plan, entitled "Interstate Access Productivity Offsets for Mid-Size Telephone Companies," June 8, 1990.

State of Maine Public Utilities Commission (Docket No. 89-397) on behalf of New England Telephone & Telegraph Company: theoretical and historical analysis of incentive regulation in telecommunications, entitled "Incentive Regulation in Telecommunications," filed June 15, 1990.

Illinois Commerce Commission (Docket No. 88-0412) on behalf of Illinois Bell Telephone Company: analysis of pricing issues for public telephone service. Filed August 3, 1990. Rebuttal testimony filed December 9, 1991.

Delaware Public Service Commission (Docket No. 89-24T) on behalf of The Diamond State Telephone Company: rebuttal testimony describing the appropriate costing and pricing methods for the provision of contract Centrex services by a local exchange carrier. Filed August 17, 1990.

Montana Public Service Commission (Docket No. 90.8.46) on behalf of US West Communications: theoretical and historical analysis of incentive regulation plans in telecommunications. Filed October 4, 1990.

Arizona State Air Pollution Control Hearing Board (Docket No. A-90-02) on behalf of Arizona Public Service Company. A statistical study of SO_2 emissions entitled, "Analysis of Cholla Unit 2 SO_2 Compliance Test Data," (October 24, 1990) and an Affidavit (December 7, 1990).

Canadian Radio-Television and Telecommunications Commission (Docket No. 1990-73) on behalf of Bell Canada: "The Effect of Competition on U.S. Telecommunications Performance," (with L.J. Perl). Filed November 30, 1990.

New Jersey Board of Public Utilities (Docket No. TX90050349) on behalf of New Jersey Bell Telephone Company: theoretical and empirical analysis of the Board's intraLATA compensation policy. Filed December 6, 1990.

Federal Communications Commission (Docket 87-313) on behalf of the United States Telephone Association: analysis of total factor productivity calculations, entitled "Productivity Measurements in the Price Cap Docket," December 21, 1990.

Tennessee Public Service Commission (In re: The Promulgation of Agency Statements of General Applicability to Telephone Companies That Prescribe New Policies and Procedures for Their Regulation) on behalf of South Central Bell Telephone Company: theoretical analysis and appraisal of the proposed Tennessee Regulatory Reform Plan. Filed February 20, 1991.

Florida Public Service Commission (Docket No. 900633-TL) on behalf of Southern Bell Telephone and Telegraph Company: alternative measures of cross-subsidization. May 9, 1991.

Federal Communications Commission (Docket 87-313) on behalf of BellSouth Corporation, "The Treatment of New Services under Price Cap Regulation," (with Alfred E. Kahn), June 12, 1991.

Federal Communications Commission (Docket 91-141, Expanded Interconnection with Local Telephone Company Facilities) on behalf of Bell Atlantic, "Effects of Competitive Entry in the U.S. Interstate Toll Markets." August 6, 1991.

California Public Utilities Commission (Phase II of Case 90-07-037) on behalf of Pacific Bell: economic analysis of the effects of FAS 106, (accrual accounting for post-retirement benefits other than pensions) under state price cap regulation, (with Timothy J. Tardiff). Filed August 30, 1991 Supplemental testimony filed January 21, 1992.

Federal Communications Commission (Docket 91-141, Expanded Interconnection with Local Telephone Company Facilities) on behalf of Southwestern Bell, "Economic Effects of the FCC's Tentative Proposal for Interstate Access Transport Services." Filed September 20, 1991.

Rhode Island Public Utilities Commission (Docket No. 1997) on behalf of New England Telephone & Telegraph Company, "Rhode Island Price Regulation Plan," analysis of proposed price regulation plan and evidence of the effects of incentive regulation on prices and infrastructure development. Filed September 30, 1991.

Montana Public Service Commission (Docket No. 90.12.86) on behalf of US West Communications: economic analysis of a proposed incentive regulation plan. Filed November 4, 1991. Additional testimony filed January 15, 1992.

Testimony before the Michigan Circuit Court (Case No. 87-709234-CE and 87-709232-CE) on behalf of Combustion Engineering, Inc., in *Her Majesty the Queen, et al., v. Greater Detroit Resource Recovery Authority, et al.*, re statistical analysis of air pollution data to determine emissions limits for the Detroit municipal waste-to-energy facility, February, 1992.

Federal Communications Commission, (Pacific Bell Tariff F.C.C. No. 128, Transmittal No. 1579) on behalf of Pacific Bell, "The Treatment of FAS 106 Accounting Changes Under FCC Price Cap Regulation," (with T.J. Tardiff). Filed April 15, 1992. Reply comments filed July 31, 1992.

New York Public Service Commission (Case No. 28425) on behalf of New York Telephone Company, "Costs and Benefits of IntraLATA Presubscription," (with T.J. Tardiff), filed May 1, 1992.

California Public Utilities Commission, (Docket No. I.87-11-033), on behalf of Pacific Bell, "The New Regulatory Framework 1990-1992: An Economic Review," (with T.J. Tardiff), filed May 1, 1992.

New Hampshire Public Service Commission, (Docket DE 90-002), on behalf of New England Telephone & Telegraph Company: the appropriate relationship between carrier access and toll prices. Filed May 1, 1992. Reply testimony filed July 10, 1992. Rebuttal testimony filed August 21, 1992.

Delaware Public Utilities Commission, (Docket No. 33), on behalf of Diamond State Telephone Company, "Incentive Regulation of Telecommunications Utilities in Delaware," filed June 22, 1992.

Federal Communications Commission, (CC Docket 92-141, In the Matter of 1992 Annual Access Tariff Filings) on behalf of Bell Atlantic, "Effects of Competitive Entry in the U.S. Interstate Toll Markets: An Update," filed July 10, 1992.

Florida Public Service Commission (Docket No. 920385-TL) on behalf of Southern Bell Telephone and Telegraph Company: the economic relationship between depreciation rates, investment, and infrastructure development. September 3, 1992.

Maryland Public Service Commission (Case No. 8462) on behalf of The Chesapeake and Potomac Telephone Company of Maryland: competition and the appropriate regulatory treatment of Yellow Pages, filed October 2, 1992.

Federal Communications Commission (ET Docket 92-100) on behalf of BellSouth Corporation, "Assigning PCS Spectrum: An Economic Analysis of Eligibility Requirements and Licensing Mechanisms," (with Richard Schmalensee), filed November 9, 1992.

Florida Public Service Commission (Docket No. 920260-TL) on behalf of Southern Bell Telephone and Telegraph Company: economic analysis of a proposed price cap regulation plan. December 18, 1992.

Science, Technology and Energy Committee of the New Hampshire House of Representatives on behalf of New England Telephone Company, "An Economic Perspective on New Hampshire Senate Bill 77," an analysis of resale of intraLATA toll services. April 6, 1993

California Public Utilities Commission, (Docket No. I.87-11-033), on behalf of Pacific Bell, "Pacific Bell's Performance Under the New Regulatory Framework: An Economic Evaluation of the First Three Years," (with T.J. Tardiff), filed April 8, 1993, reply testimony filed May 7, 1993.